$COL775_A1_part2$

cs1210556

April 2024

1 Seq2Seq with Glove embeddings

On Train, Exact match accuracy achieved was 65%, while execution accuracy was similar at 68%
On both Val and Test sets, the accuracy was roughly 56%

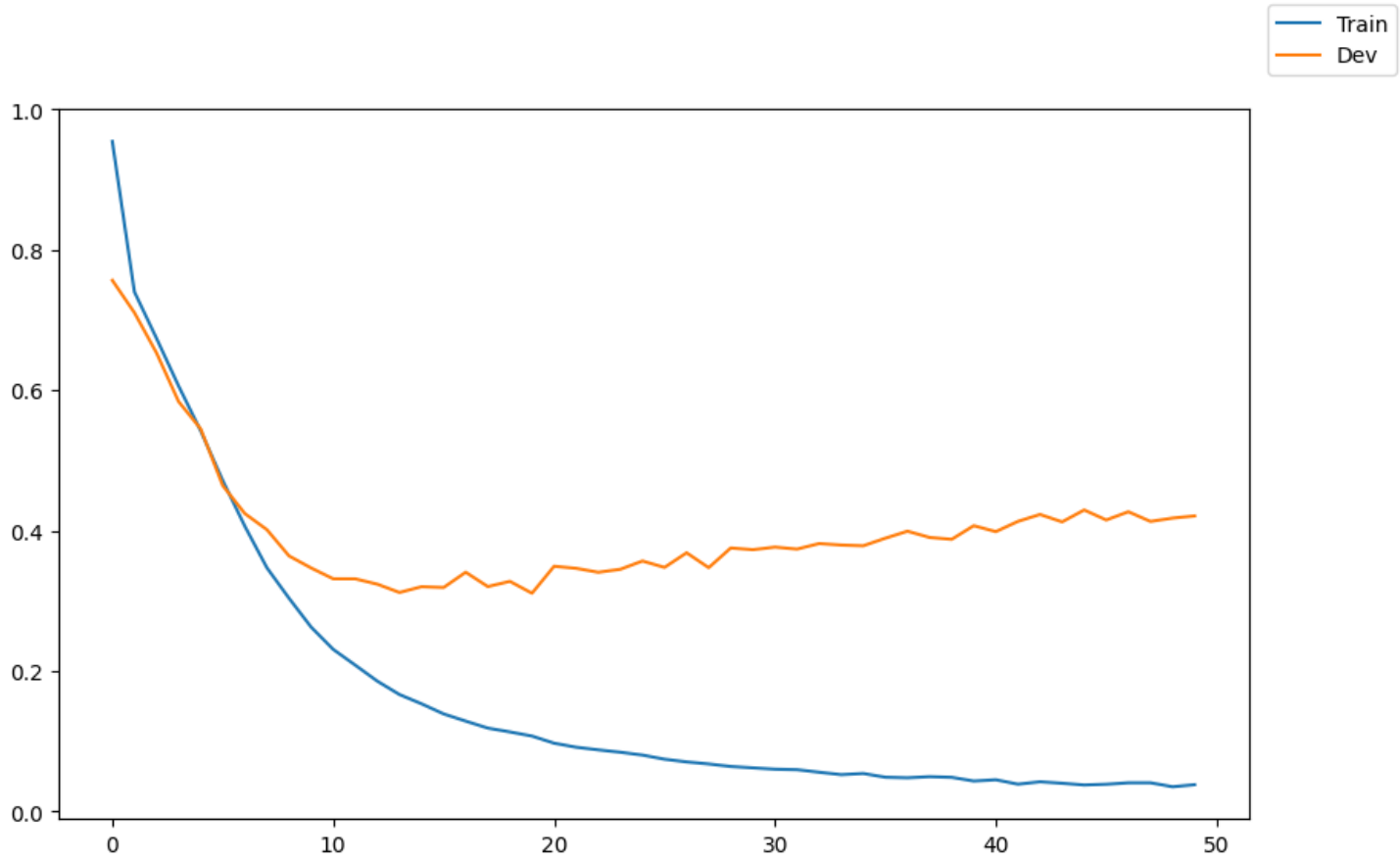

Figure 1: Loss Curve for normal Seq2Seq with LSTMs. blue is Train, orange is val

As can be seen from the figure, the Val loss gets to a minima very soon at only around 15 epochs, while the train loss keeps on decreasing.

Hyperparameter settings :
Embeddings : Glove-wiki-200
Hidden size = 200 for Encoder, 400 for Decoder.
Encoder = Bidirectional LSTM with 2 layers per direction.
Decoder = Normal LSTM with 2 layers.

2 Seq2seq with Attention

The Curves are roughly similar, but with attention the accuracy we get becomes higher.

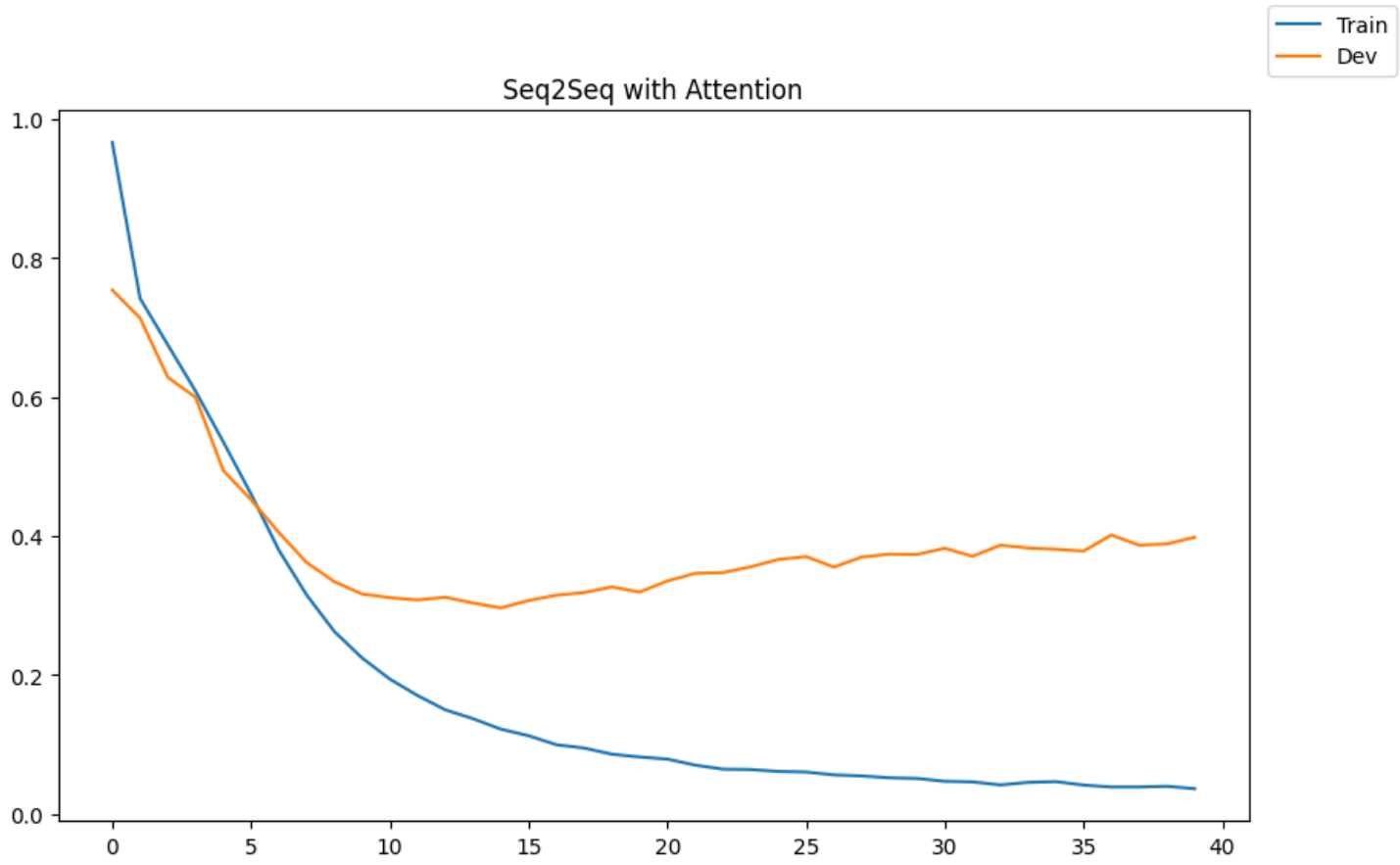

Figure 2: Loss Curve for Attention Seq2Seq with LSTMs. blue is Train, orange is val

Hyperparameter settings: Embeddings: Glove-wiki-200 Hidden size = 200 for Encoder, 400 for Decoder, Attention type = Bahadanau

the accuracies are given in the next part.

3 Effect of Teacher Forcing

With teacher forcing = 0.3, the loss curve we get is much more jagged. at the same time, it takes the longest to reach a minima for the Val set, and it's minimum loss is above 0.4

for teacher forcing = 0.6, we get the best loss curve, smooth enough and quickly decreasing at the start till the minima. The minima is around 0.3 for Val, which is much lower than when TF = 0.3 hence we can expect higher accuracy.

For teacher forcing = 0.9, the curve is similar to when 0.6, but it's minima is higher than 0.3 and more jagged.

On comparing the Exact match accuracies, we can see that TF=0.6 outperforms the other 2. On Validation and Test set accuracies: TF = 0.6 Exact match accuracy = 0.65 on Val/Test and 0.73 on Train TF = 0.9 Exact match accuracy = 0.62 on val/Test and 0.7 on Train TF = 0.3 Exact match accuracy = 0.58 on val/Test and 0.65 on Train

4 Google drive link

https://drive.google.com/drive/folders/14jmDhrRM3bhQWCN5Bds549afHFCXUBYr?usp=drive$_link$

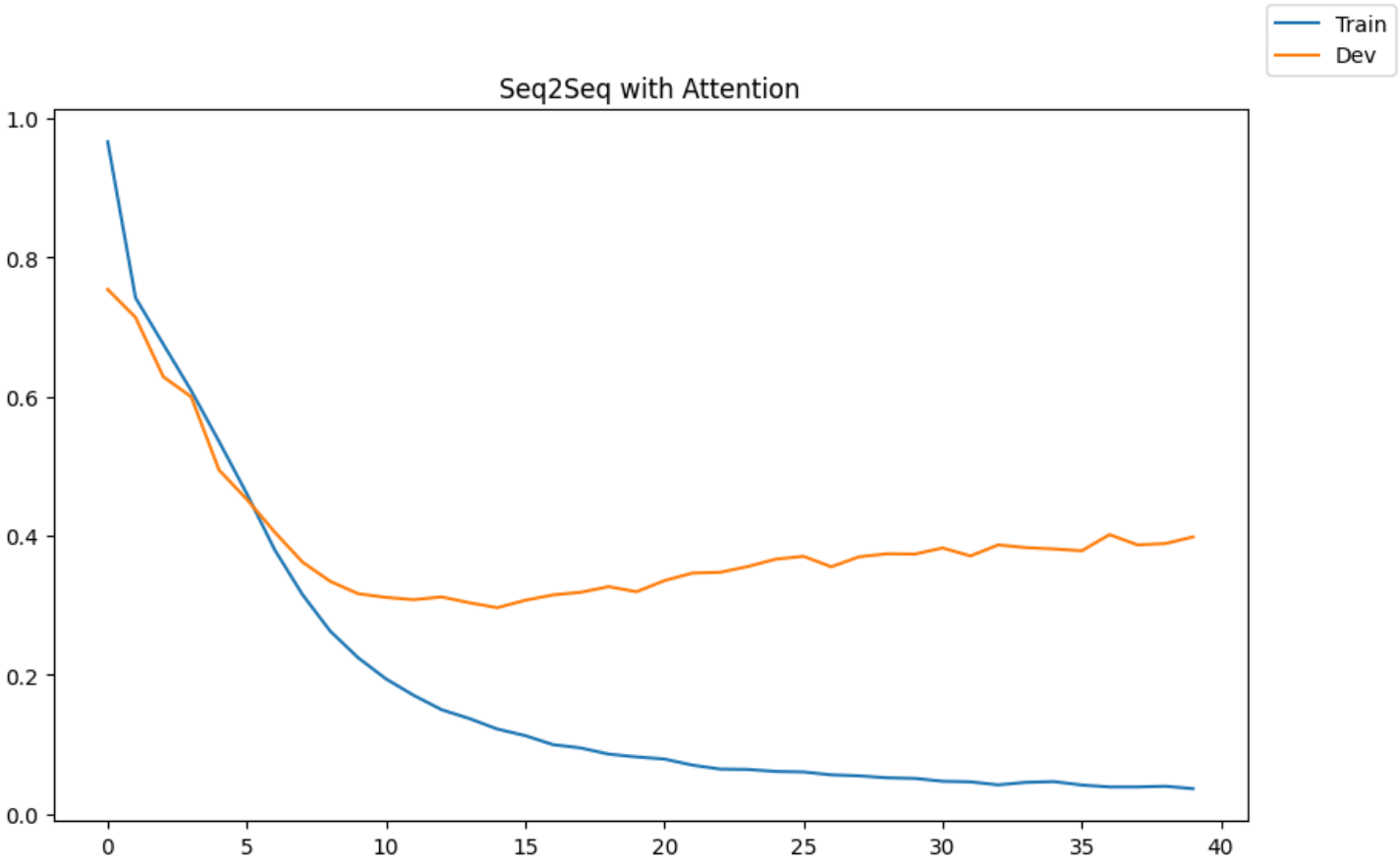

Figure 3: Loss curve when TF = 0.6

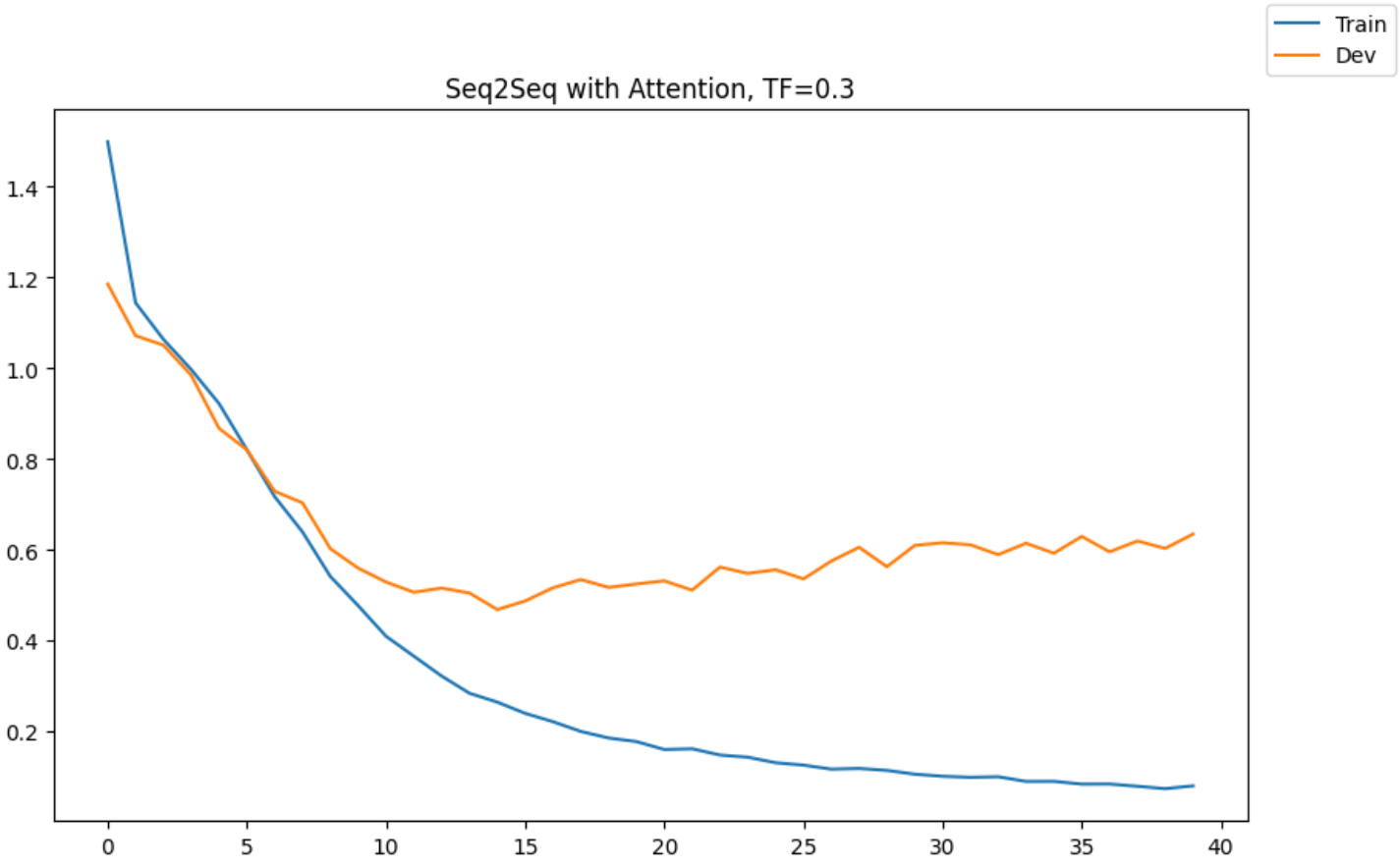

Figure 4: Loss curve when TF = 0.3

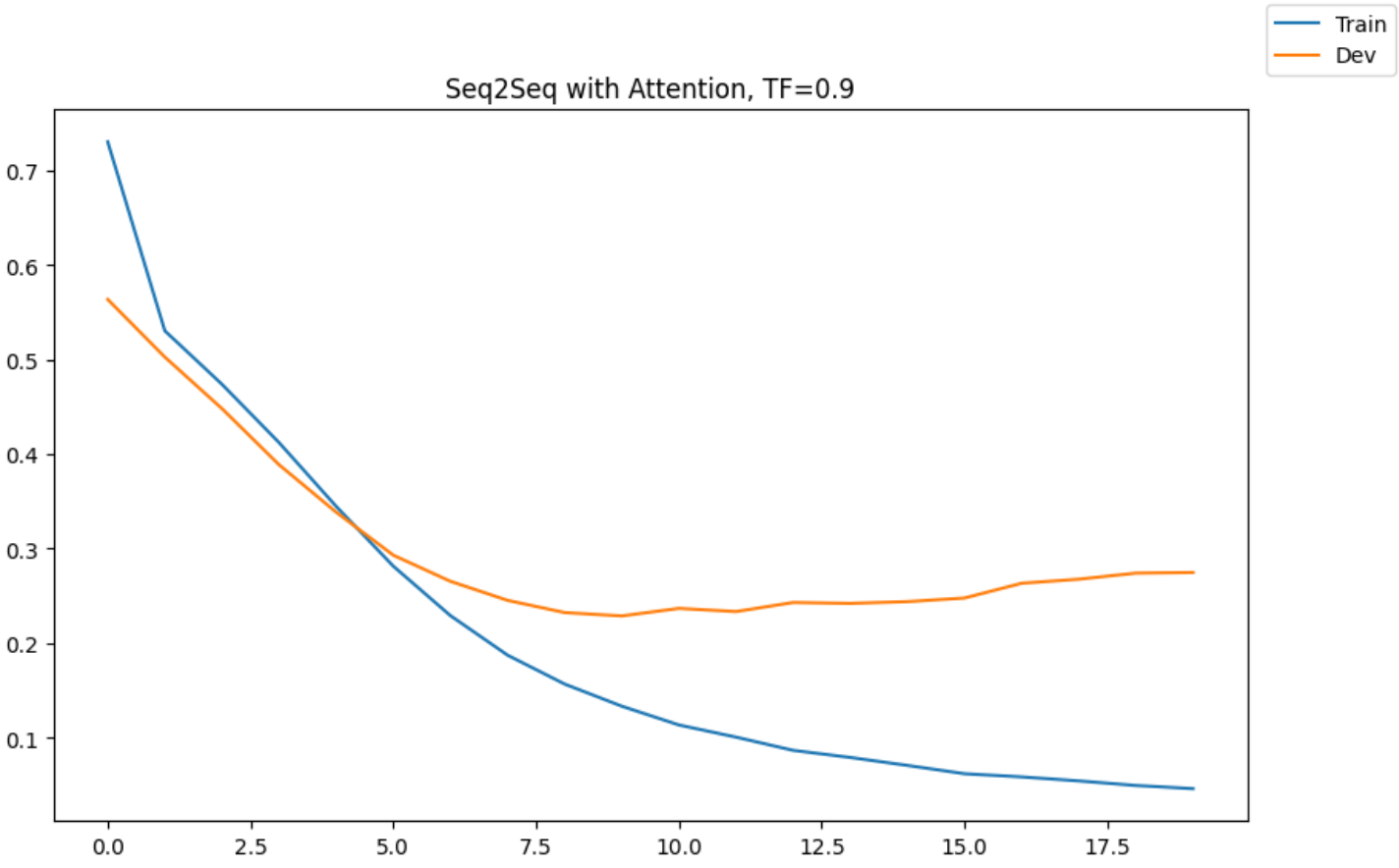

Figure 5: Loss curve when TF = 0.9